



INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

Deflection Calculation for the Soviet AA Combined Height and Range Finder and Predictor AB/V REFERENCES RD DATE OF NO. PAGES 3 REFERENCES RD DATE ACC. SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE. 1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation TM, above the horizontal plane K. If the angular velocity measured in the horizontal [Kartenebere] plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value oos TM. The vertical angular velocity, the vertical angular velocity WI, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: V2			S-E-C-R-E-T		nner to an unauthorized person is prohibited by law. SSING COPY					
AAC Combined Height and Range Finder and Predictor AB/V REFERENCES RD ANTE OF NO. HACE & NO. HACE & SOURCE EVALUATIONS ARE DEFINITIVE. 1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal /Kartenebene/ plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value oos YM. The vertical angular velocity WI, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: 12 2 2 2 2 W = W cos YM + WY 2. If the angular velocities are carried over at an interval equal to unity to the present position eW, the following linear velocities are obtained: the lateral component of velocity WO cos YMF / Sic: probably WO cos YM / Funning perpendicular to the plane of sight and represented by the distance XD or BM, and the vertical component of velocity WO cos YMF / Sic: probably WO cos YM / Tunning perpendicular to the plane of sight and represented by the distance XD or BM, and the vertical component of velocity WO cos YMF / Sic: probably WO cos YM / Tunning perpendicular to the plane of sight and represented by the distance XD or BM, and the vertical component of velocity wo the content of velocity in the plane of flight and has the value eMWO. The true flight velocity D is arrived at with the aid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance WO more position, represented by the distance MO more position, represented by the distance MO more position, represented by the distance MO more position, represented by the distance	DUNTRY	USSR/East Germany		REPORT						
ATE OF NO. PAGES 3 REFERENCES RD ATE OF NO. AND AGE & ATE ACQ. SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE. 1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal for parallel of latitude has the value cos YM. The vertical angular velocity, the vertical angular velocity WY, ites in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: 12 2 2 2 2 W = W cos YM + WY 0 0 2. If the angular velocities are carried over at an interval equal to unity to the present position of target M at an interval equal to the slant range to present position eM, the following linear velocities are obtained: the lateral component of velocity WO cos YMN / sic: probably Wo cos YM / running perpendicular to the plane of sight and represented by the distance KO or BM, and the vertical component of velocity WO cos YMN / sic: probably Wo cos YM / running perpendicular to the plane of sight and represented by the distance KO or BM, and the vertical component of velocity with the plane of flight and has the value eWMO. The true flight velocity D is arrived at with the sid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance MO more position, repres	IBJECT	Deflection Calcul	ation for the Soviet	DATE DISTR.	2	2 June 1958				
ATE OF ATE ACQ. SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE. 1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal [Karteneberg plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value cos YM. The vertical angle of velocity, the vertical angular velocity WT, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: 12 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			Committee of the commit	NO. PAGES		3				
1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal /Kartenebene/ plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value cos YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: V				REFERENCES	RD					
1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal [Kartenebene] plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value osa YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: 12							252			
1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal /Kartenebene/ plane is designated Wo, then the angular velocity in the plane of the parallel of latitude has the value cos YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: \[\begin{array}{c} \leq 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2							25X			
three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal [Kartenebene] plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value oos YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore: \[\frac{12}{W^2} = \frac{2}{W} \text{ cos YM + WY} \] 2. If the angular velocities are carried over at an interval equal to unity to the present position of target M at an interval equal to the slant range to present position eM, the following linear velocities are obtained: the lateral component of velocity WO cos YMEN [sic: probably WO cos YM] running perpendicular to the plane of sight and represented by the distance MG or EM, and the vertical component of velocity eMWY on the line of sight GM and represented by the distance AB or GD. The resultant corresponds to the lateral component of velocity in the plane of flight and has the value eMWO. The true flight velocity of is arrived at with the aid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance MA KW DM. This is the change of target speed of the range VE. 3. In the triangle MAB, the angle AMB is the angle of elevation for the velocity component ME; thus from: \[\text{Cos YM - V}_e / \text{MB}_p \] \[\text{We get the designation:} \] \[\text{MB = V}_e / \text{cos YM}_p \] \[\text{We get the designation:} \]	WE AGG.	SOURCE EVALUAT	IONS ARE DEFINITIVE. APPRA	ISAL OF CONTE	NT IS TEN	NTATIVE.				
the present position of target M at an interval equal to the slant range to present position eM, the following linear velocities are obtained: the lateral component of velocity WO cos YMEN /sic: probably WO cos YMM running perpendicular to the plane of sight and represented by the distance MG or BM, and the vertical component of velocity eMWY on the line of sight GM and represented by the distance AB or GD. The resultant corresponds to the lateral component of velocity in the plane of flight and has the value eMWO. The true flight velocity D is arrived at with the aid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance MA KW DM. This is the change of target speed of the range VE. 3. In the triangle MAB, the angle AMB is the angle of elevation for the velocity component MB; thus from: \[\text{Cos YM = Ve/MB}, \text{We/MB}, \text{We get the designation:} \] \[\text{MB = Ve/cos YM.} \] Since MB is the change of target speed in the horizontal plane, we can also write:	in ve	the horizontal \int_{K}^{K} locity in the plan rtical angle of ve	artenebene/ plane is de e of the parallel of la	esignated WO, atitude has 1	, then t the valu	the angular ue c os YM.	The			
component MB; thus from: $\cos YM = V_e / MB,$ we get the designation: $MB = V_e / \cos YM.$ Since MB is the change of target speed in the horizontal plane, we can also write:	pl an	ane of sight V pas d horizontal, give	sing through the merid together the lateral Therefore:	ian. Both co	omponen veloci	ts, the vert ty WO lying	ical			
we get the designation: $ MB = V_e/\cos YM. $ Since MB is the change of target speed in the horizontal plane, we can also write:	pl an th	ane of sight V pasd horizontal, give e flight plane F. The angular velocite present position emponent of velocity the plane of sight plane of sight plane of sight plane and the plane of the plane of velocity in the plane is arrive elecity D is arrive the velocity component of the plane of	sing through the merid together the lateral Therefore: 1 W 0 ities are carried over of target M at an int the following linear y WO cos YMEN sic: prot and represented by the following that correlate of flight and has ad at with the aid of the change of ra	ian. Both cocomponent of 2 2 2 W con 0 at an interverval equal to velocities an obably Wo con he distance line of sigle esponds to the value en he third compange to present	omponent velocities YM + val equato the re obtains YM T But GM and the later MWO. Toponent int posities of the posities of the recognities of the	ts, the vert ty WO lying 2 WY al to unity slant range ined: the l unning perpe M, and the nd represent ral componen he true flig of velocity, tion, repres	to to to ateral ndicular ed by th			
Since MB is the change of target speed in the horizontal plane, we can also write:	pl an th 2. If th pr cc to ve th of ve th	ane of sight V pasd horizontal, give e flight plane F. The angular velocite present position emponent of velocity in the plane of sight prical component of velocity in the placity D is arrived to the distance MA F. The distance MA F. The triangle MAB, at the triangle MAB,	sing through the merid together the lateral Therefore: 1 W 0 itties are carried over of target M at an int the following linear y WO cos YMEN /sic: prot and represented by the velocity eMWY on the ED. The resultant correlane of flight and has ad at with the aid of the change of raw DM. This is the chatten angle AMB is the arms:	ian. Both cocomponent of 2 2 2 2 W con 0 at an interverval equal to velocities an obably Wo con he distance he line of sigle esponds to the value en he third compange to present nge of target ngle of eleval	val equito the re obtained at ion for a transfer of the position of the positi	ts, the vert ty WO lying 2 WY al to unity slant range ined: the l unning perpe M, and the nd represent ral componen he true flig of velocity, tion, repres of the rang	to to to ateral ndicular ed by th th ented e VE.			
S-E-C-R-E-T	2. If the property of the prop	ane of sight V pass d horizontal, give e flight plane F. The angular velocite present position emponent of velocity the plane of sigh retical component of velocity D is arrived to the distance AB or C velocity D is arrived to the distance MA F. The triangle MAB, amponent MB; thus for the distance MA F.	sing through the merid together the lateral Therefore: 1 W 0 itties are carried over of target M at an int the following linear y WO cos YMEN /sic: prot and represented by the velocity eMWY on the D. The resultant corrolane of flight and has ad at with the aid of the change of raw DM. This is the charteness and the angle AMB is the acrom: con:	ian. Both cocomponent of 2 2 2 W con 0 at an interverval equal e	wal equito the re obtained ation for the symmetric point of the symmetric point of the speed ation for the speed ation for the symmetric point of the speed ation for	ts, the vert ty WO lying 2 WY al to unity slant range ined: the l unning perpe M, and the nd represent ral componen he true flig of velocity, tion, repres of the rang	to to to ateral ndicular ed by th th ented e VE.			
	2. Iff th pr tc ve th of ve th of ve th of ve th of ve	ane of sight V pass d horizontal, give e flight plane F. The angular velocite present position emponent of velocity the plane of sigh extical component of velocity in the plane of sigh extical component of velocity in the plane of the distance AB or of the velocity in the plane of the distance MA F. the triangle MAB omponent MB; thus it is get the designation	sing through the merid together the lateral Therefore: 1 W 2 ities are carried over of target M at an interest of target M at an interest of target M at an interest of the following linear y WO cos YMEN /sic: protect and represented by the velocity eMWY on the DD. The resultant correlane of flight and has ad at with the aid of the change of raw DM. This is the chartent of the change of raw DM. This is the afterest of the angle AMB is the afterest.	ian. Both cocomponent of 2 2 2 2 2 W con 0 at an interverval equal to velocities an obably WO con he distance he line of sight exponds to the value element of the velocities and the velocities and the velocities and the distance he distance he third compande to present made of target and the velocities and the vel	val equito the re obtained or Bind or	ts, the vert ty WO lying 2 WY al to unity slant range ined: the l unning perpe M, and the nd represent ral componen he true flig of velocity, tion, repres of the rang or the veloc	to to to ateral ndicular ed by th ht ented e VE. ity			

The target speed V is to be calculated from the right triangle MMB. It follows that:

and;

$$\cos YM = eKM/e_M$$
,

consequently;

When the altitude of the flight path remains the same, V is likewise the horizontal velocity VH.

The velocity component in relation to the line of sight, at a distance of unity and at a distance e/n:

MA $\stackrel{=}{\text{-}}$ DM₁ change of target speed of the range ve

AB = CD vertical component of velocity VY ± WY M

 BM_1 = MG lateral component of velocity V_0 = W_0 cos YM^eM = W_0 eKM

 AM_{l} x MD lateral component of velocity in the plane of flight

$$V_0' = W_0' e_M = e_M \sqrt{W^2 + W_0^2 \cos^2 YM}$$

MM, flight velocity V

 MB^{1} = $\mathrm{M}_{1}\mathrm{G}$ change of velocity of the horizontal range

VeK = Ve/cos YM

F-plane of flight

V-plane of sight

G-instrument position

S-E-C-R-E-T

25X1

25X1

S-E-C-R-E-T

Flight Path

Flight Path

Wo ym g

MT TEKM

S-E-C-R-E-T

25 ·

25X1

25X1





INFORMATION REPORT PRIFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

This material contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Secs. 783 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

S-E-C-R-E-T 25X1 COUNTRY USSR/East Germany REPORT **SUBJECT** Deflection Calculation for the Soviet DATE DISTR. 2 June 1958 AA Combined Height and Range Finder and Predictor AB/V NO. PAGES 3 RD REFERENCES 25X1 DATE OF INFO. PLACE & DATE ACQ. 25X1 SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE

1. On the sphere, with the radius one, considered to be around the observer G, three definite angular velocities can be given at point Mo, at which the line of sight intersects the sphere. The horizontal angular velocity lies in the plane of the parallel of latitude going through Mo, below the angle of elevation YM, above the horizontal plane K. If the angular velocity measured in the horizontal /Kartenebene/ plane is designated WO, then the angular velocity in the plane of the parallel of latitude has the value cos YM. The vertical angle of velocity, the vertical angular velocity WY, lies in the plane of sight V passing through the meridian. Both components, the vertical and horizontal, give together the lateral component of velocity WO lying in the flight plane F. Therefore:

- 2. If the angular velocities are carried over at an interval equal to unity to the present position of target M at an interval equal to the slant range to present position eM, the following linear velocities are obtained: the lateral component of velocity WO cos YMEN sic: probably WO cos YMM running perpendicular to the plane of sight and represented by the distance MG or BM, and the vertical component of velocity eMWY on the line of sight GM and represented by the distance AB or GD. The resultant corresponds to the lateral component of velocity in the plane of flight and has the value eMWO. The true flight velocity D is arrived at with the aid of the third component of velocity, the velocity component of the change of range to present position, represented by the distance MA KW DM. This is the change of target speed of the range VE.
- 3. In the triangle MAB, the angle AMB is the angle of elevation for the velocity component MB; thus from:

we get the designation:

 $MB = V_e/\cos YM$.

Since MB is the change of target speed in the horizontal plane, we can also write:

STATE	х	ARMY	х	N AVY	х	AIR	EV	х	FBI	AEC			Ţ	
[Note: Washington distribution indicated by "X"; Field distribution by "#".)														

S-E-C-R-E-T

25X1

INFORMATION REPORT INFORMATION REPORT

$$V K = V / \cos YM$$
.

The target speed V is to be calculated from the right triangle MMB. It follows that:

and:

 $\cos YM = eKM/e_M$

consequently:

When the altitude of the flight path remains the same, V is likewise the horizontal velocity VH.

The velocity component in relation to the line of sight, at a distance of unity and at a distance e/n:

MA = DM₁ change of target speed of the range ve

AB = CD vertical component of velocity VY ± WY M

 BM_1 = MG lateral component of velocity V_O = W_O cos $\mathrm{YM}^\mathrm{e}\mathrm{M}$ = W_O eKM

 \mathtt{AM}_{1} x MD lateral component of velocity in the plane of flight

$$V_0' = W_0' = M = M$$
 $V_0' = V_0' = V_0'$

 MM_{\uparrow} flight velocity V

 MB^{l} = $\mathrm{M}_{\mathrm{l}}^{\mathrm{G}}$ change of velocity of the horizontal range

VeK = Ve/cos YM

F-plane of flight

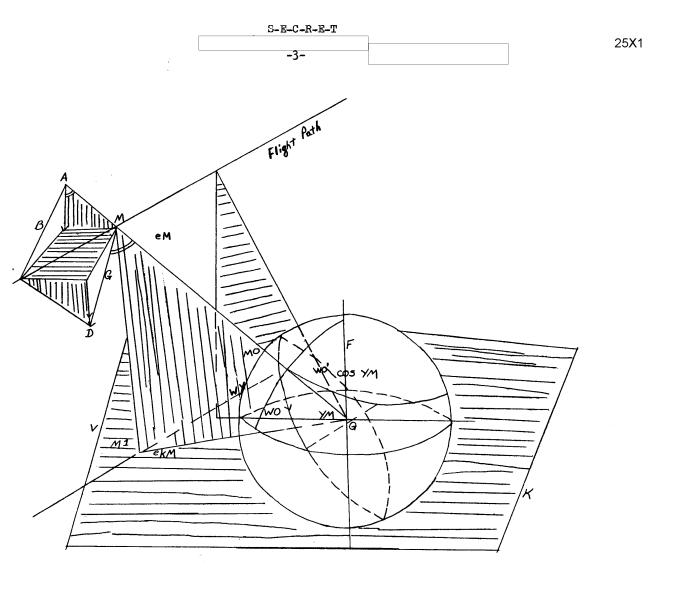
V-plane of sight

G-instrument position

25X1

S-E-C-R-E-T

25X1



S-E-C-R-E-T

25**X**1

4. P. --